The Claims

What is claimed is:

1. A gas turbine plant comprising:

a circuit including a compressor, a combustion chamber, a turbine and at least one heat sink, the gas turbine plant being operated with (1) a working medium in the form of a carbon dioxide/water mixture, (2) a hydrocarbon reacting as fuel with oxygen in the combustion chamber, and (3) excess carbon dioxide and water thereby occurring being tapped from the circuit at a suitable point;

wherein the compressor and the turbine each have a rotor and a casing between which flow ducts run for the working medium, moving blades arranged on the rotor, and guide blade cascades arranged in the flow ducts;

wherein the rotor and casing of at least one of the compressor and the turbine largely correspond to a rotor and a casing respectively of a compressor designed for air as the working medium or respectively of a turbine designed for air as the working medium; and

wherein in at least one of the compressor and the turbine in the circuit, expansion behavior of the working medium is accommodated by modifications of at least one of the flow ducts, the moving blades, and the guide blade cascades.

2. The gas turbine plant of claim 1, wherein free flow cross-sections on a high-pressure side of at least one of the compressor and turbine are reduced by blocking some of the flow ducts in the guide blade cascade in the form of blocked sectors.

3. The gas turbine plant of claim 1, wherein free flow cross-sections on a high-pressure side of at least one of the compressor and turbine are reduced by inserting annular flow obstacles in the guide blade cascades.

4. The gas turbine plant of claim 1, wherein the guide blade cascades are adjustable and free flow cross-sections on a high-pressure side of at least one of the compressor and turbine are reduced by the guide blade cascades.

5. The gas turbine plant of claim 1, wherein free flow cross-sections in at least one of the compressor and turbine remain unchanged, and instead the blades of the compressor or the turbine are configured and dimensioned to accommodate changed axial speeds.

6. The gas turbine plant of claim 1, wherein adjustable guide blade cascades are provided in at least one of the compressor and turbine in order to compensate for variations in thermodynamic properties of the working medium, said variations being caused by inert gases.

7. The gas turbine plant of claim 1, wherein the heat sink is designed for the generation of steam, and at least one part stream of steam generated therefrom is supplied for cooling of components of the turbine that are subjected to thermal load.

8. The gas turbine plant of claim 1, wherein the heat sink is designed for generating steam for operating a steam turbine, and a part stream of steam generated therefrom is supplied for cooling of components of the turbine that are subjected to thermal load.

9. The gas turbine plant of claim 1, wherein means for condensing the working medium by discharging heat are provided, and a pump is provided instead of the compressor.

10. A gas turbine plant comprising:

a circuit including a compressor, a combustion chamber, a turbine and at least one heat sink, the gas turbine plant being operated with (1) a working medium in the form of a carbon dioxide/water mixture, (2) a hydrocarbon reacting as fuel with oxygen in the combustion chamber, and (3) excess carbon dioxide and water being discharged from the circuit at a point downstream from the compressor;

wherein the compressor and turbine each have a rotor and a casing with flow ducts for the working medium running therebetween, moving blades disposed on the rotor, and guide blade cascades disposed in the flow ducts;

wherein the rotor and casing of at least one of the compressor and the turbine are configured and dimensioned for use with an alternate working medium in the form of air; and

wherein expansion behavior of the carbon dioxide/water mixture in at least one of the compressor and turbine is accommodated by adjustment of at least one of the flow ducts, the moving blades, and the guide blade cascades.

11. The gas turbine plant of claim 10, wherein at least some of the flow ducts are at least partially blocked.

12. The gas turbine plant of claim 11, wherein the guide blade cascades comprise blocked sectors.

13. The gas turbine plant of claim 10, further comprising annular flow obstacles in the guide blade cascades.

14. The gas turbine plant of claim 10, wherein free flow cross-sections on a high-pressure side of at least one of the compressor and turbine are at least partially blocked.

15. The gas turbine plant of claim 10, wherein the adjustable guide blade cascades comprise adjustable guide blades.

16. A gas turbine plant comprising:

a compressor;

a combustion chamber;

a multi-stage turbine arranged with individual stages having progressively reduced flow cross-sections;

at least one heat sink;

a working medium in the form of a carbon dioxide/water mixture; and

a hydrocarbon reacting as fuel with oxygen in a combustion chamber;

wherein excess carbon dioxide and water is discharged downstream from the compressor, and

wherein a rotor and a casing of at least one of the compressor and the turbine are configured and dimensioned for use with an alternate working medium in the form of air.

17. The gas turbine plant of claim 16, further comprising flow ducts in at least one of the compressor and turbine that are at least partially blocked.

18. The gas turbine plant of claim 16, further comprising guide blade cascades in at least one of the compressor and turbine with blocked sectors.

19. The gas turbine plant of claim 16, further comprising guide blade cascades in at least one of the compressor and turbine with adjustable guide blades.

20. The gas turbine plant of claim 16, wherein flow cross-sections on a high-pressure side of the compressor are at least partially blocked.